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Collaboration in the Printworks—II*

By T. C. HUTCHINS

FROM the other point of view† there are many ways in which the machine printer can help the color mixer, by various adjustments that will alter printing conditions so as to make a color work more easily. In the first place a printer may adjust his doctor blades in various ways that will be conducive to better working of the colors. It is necessary always to keep in mind that a blade will only function properly if the edge is kept sharp and keen. Should the edge for any reason become dull, bad work is sure to result. The function of a blade as is well known is to clean all surplus color off the roller leaving just enough in the engraving to do the printing, without flushing or bleeding. If the blade is not in perfect condition and the edge allowed to become rough or rounded, this function will not be performed and damage will result.

The writer has had occasion to observe the methods of various printers from time to time and compare the results of their working. It was noticed in one instance that a certain printer had a larger proportion of damages than any other man in a particular shop. On careful observation it was noted that this man did not take nearly so much care of his doctor blades and lints as the other men. For instance, another man in the same shop always took out his blades and lints after a certain period of running and if they needed attention in the way of filing or honing (dressing) it was given them. The point to remember is that the man always examined his blades whether they seemed to need attention or not. The result was that his percentage of damages was not nearly so high as the man's referred to, who would print on for prolonged periods and pay very little attention to his blades in this respect.

Where a dark color is working into a light one it is customary to put in a lint in order to catch the color lifted by the roller printing the light color, from the impression made by the roller bearing the dark color. While the edge of the lint is sharp and keen this function is performed thoroughly and the surplus dark color is kept from soiling the lighter shade. On the other hand if the edge of the blade is allowed to become bevelled or rounded, a certain amount of dark color, depending on the condition of the blade, escapes and is carried over, resulting very often in alteration of the tone of the light color. In every case this could be prevented to a very great extent by proper attention to the state of the edge of the brass or composition lint.

Regarding the doctor blades, something of the same nature happens if the edge becomes bevelled by continual working against the copper roller. In the case of failure here, the sharpness of the print is marred and the whole in a bad case is made to look blurred and indistinct about the edges, while if very dark colors are being used, soiling of the whites may even take place, due to a thin film of color being allowed to pass, by the faulty edge of the blade. In direct prints this may not be noticeable, but where discharge prints are in question such a film of discharge color passing the edge of the doctor makes itself apparent in the alteration of the ground shade of the dye. In this case the dye is flattened and dull, while in a really bad instance the damage will extend to streaks and scums, which in such a style cannot be removed.

In order to prevent such damage as much as possible the printer should study the behavior of the various colors from time to time. He will probably find that certain types of color are much more liable to cause damage than others and if he has an opportunity of talking to the color-mixer, he will in all likelihood learn that such colors are very often difficult to dissolve. Where such is definitely known to be the case the printer can be on his guard and make provision accordingly.

For the purpose of combating these difficulties, it is

*This is a continuation of the article appearing in our issue of Dec. 18, 1933.

†The first article discussed methods in which the designer and color mixer could help the printer.

usual to keep a stock of blades differing in temper from "soft" to "hard" steel blades while composition and spring blades are also used. In the case of a color which is known to be "streaky," i.e., prone to break the edge of doctor, due to some defect in solubility or it may be to a chemical action on the blade, whatever the cause is, it is the printer's and color-mixer's duty to try to overcome the defect so as to produce a perfect print. On the printer's part this may be done by using a very hard blade, the edge of which will not easily be broken or attacked. The use of such a blade will make all the difference between good work and bad. A printer, of course, prefers to use a soft blade where possible because it is not so severe on the engraving of the copper roller and is at the same time much easier to "do up," i.e., to file and dress so as to bring the edge into proper condition. From the other point of view a hard edge will last longer and so save a good deal of the time taken up in filing, etc.

Colors containing a large amount of acetic acid are liable to attack doctor blades and cause streaks. In this connection it is interesting to observe the procedure in printing alizarine reds and pinks which would be flattened considerably by the adulteration of iron from this source. Instead of using acetates and nitrates of alumina which are acid salts—and would attack the doctor edge—sulfocyanide of alumina is used so that there is no action on the doctor thus avoiding the dulling effect to which alizarines are extremely sensitive.

The setting of the edge upon the roller is also a matter requiring some degree of skill on the part of the machine printer, the sharper the set the cleaner the action. A blade set at say 45 degrees is much more likely to act efficiently than one set at 60 degrees because of the closer contact of the edge with the surface of the roller.

Regarding the pressure put on a printing roller by a printer, much damage can result to a color by injudicious handling at this point. A printer who has not troubled to make himself familiar with the colors he uses is very liable to err in this matter. For instance, if he receives a color containing a large amount of tragacanth and which looks thick he will probably put on greater pressure in order to secure sufficient penetration of the color. The result of such a manoeuvre will quite probably show in badly spewed edges and blurred prints generally. The presence of tragacanth is sufficient to ensure good penetration without any additional pressure. Vat colors especially suffer from this treatment, while other colors are forced so far into the fabric as to cause them to look quite bare and ill-furnished on the face of the cloth.

Another result of such excessive pressure is commonly known as jarring. This effect is caused by the great pressure of the rollers not allowing the cloth to proceed at a uniform rate between the nips, especially at the beginning of a run. The cloth is at a certain point retarded in a very, very slight degree in its outward progress, this is sufficient to cause a slight trail of the roller over the print so causing the smearing that is known to printers as jarring. The fault is most likely to occur where "soft" colors (i.e., those containing tragacanth and similar thickenings) are in use. Such colors do not stick to the back grey so well as more gummy mixings, containing larger proportions of British gum, etc. As a result of this lack of stickiness the impressions are not carried on with the back grey but lag behind under the retarding influence of the roller with the result aforementioned. Easing of the pressure will in a large measure counteract this tendency if this be compatible with good results in other directions.

Frothing

One of the chief objects from the colorist's point of view is to obtain as good a result as possible with the expenditure of as little color as possible. To this end colors will first of all be made as thin as it is possible for the printer to use them for the work in hand. Another important matter from the same point of view is frothing of colors. All printers and colorists know there is no more effective way to waste color than to allow it to froth badly in the color box. Once a color begins to froth there is no end to the waste till the run is finished; fresh color thrown into the box seems to react immediately to the frothing influence and is as good as thrown down the drain in many instances.

Where vat colors are concerned the writer has observed that frothing is to a very large degree absent. This may be accounted for by the methods adopted, it being noticed that different works using the same ingredients get different results in this respect. The only difference that the writer ever noticed in his own experience was when a different reducing agent was tried on one occasion. Quite as good results were obtained as regards color yields, etc., but when it came to frothing the new reducing agent put all the others in the shade and for that reason had to be abandoned for vat and basic hydrosulfite discharge colors. The agent was loud in his protests, maintaining that it had not frothed in other works; however, there it was and facts cannot be disputed.

An important item where vat colors do froth occasionally is to remember that such color need not be lost. It was noticed that if such frothy color were scraped out of the color box into a tub from time to time while the box was replenished with fresh color, the color thus saved on being allowed to settle for a day or so would regain all its former printing properties, the froth subsiding and leaving the color in its original state. On addition of a percentage of reducing agent (say 10%) to this recovered color it was found to be as good as ever. This made it evident that there is no necessity to throw out such color as being useless for further printing, as is the practice in so many works.

Printers can often mitigate, to some extent at least, such frothing by adjustment of their furnishers and color box fittings a little more carefully. A brush furnisher for instance that is screwed up very tightly against a printing roller is much more apt to cause excessive agitation of

the color in the box than one that is allowed a little more play room. Thick color will sometimes froth more easily than a thinner mixing and if judicious additions of thinner color be made at the right time much can be done to keep a color from becoming unworkable.

Paranitraniline red mixed with starch thickenings has always been a noted "frother" and as the printers say "could hardly be kept in the color box." To prevent this all sorts of additions have been suggested, turpentine, color oil, etc., but none of them were of great avail. At present, however, there is a thickening on the market for which great claims are made in this respect. The makers claim that Paranitraniline solutions printed with this product will not froth. One objection the writer has is that it is only on certain styles, e.g., very heavy blotches that this thickening can be used. The thickening certainly does give very good clear prints of good yield and penetration and from these points of view is deserving of some attention, but for fine and close work, however, it is not so good.

Arising out of this question there is the matter of the present-day Azoic colors, e.g., the Rapid Fasts which also have a tendency to froth under certain circumstances. In their first form, i.e., as pastes usually of medium thickness and finely ground, the writer's own experience of these colors was very satisfactory, although from reports there were others who were not in so happy a case.

The trouble occurred both in block prints and machine prints, particularly when the block printer was "tiering" his sieve with a brush in order to saturate it, preparatory to dipping his block. Such brushing caused the color to froth very badly, so much so that in some instances it was impossible to obtain a proper impression of the block.

As the trouble was not personal to the writer it was not regarded as serious until it cropped up later in his own experience. Having to change over on to the powder brands of these colors things went on much as usual until one day there was a spate of frothing. It was hard to account for and many things were tried until at last it was found that an addition of methylated spirits caused the trouble to cease. The most successful method is to use methylated spirits instead of turkey-red oil for pasting and dissolving the powders when making up the print color. This will entirely prevent such trouble and give much better penetration into the bargain.

The frothing of chrome mordant colors of certain types was at one time a bugbear to many printers and colorists until the problem was solved. The trouble very often occurred in light patterns where the color worked in the box for a long period without needing renewal. This led to frothing and thereafter as soon as fresh color was added it too began to froth. The trouble became so acute that the only way to obtain any sort of impression at all was to keep adding fresh color all the time, thus giving rise to a great amount of waste. It was discovered eventually that an addition of turkey-red oil to the color quite prevented the frothing and so saved at the very least 50 per cent of the color previously wasted.

Doctor Blade

Regarding alterations of shade due to adjustments or lack of such by the printer, before leaving this subject a few remarks on the effect of the doctor blade on colors might be made.

The setting of the edge has much to do with the kind of impression made, but when it comes to adjusting the pressure on the blade the effect on the yield of color must also be considered. Some printers in order to make sure that the blade will clean properly, hang an excessive number of weights on the levers. This is usually done by the type of man who will not trouble to have his blades in perfect condition, in order to cover up his own laziness. The result of such excessive pressure is that where large expanses of engraving are involved, the edge of the doctor dips and removes some of the color from the engraving thus making a lighter impression at that particular part. Another objection is that the edge soon becomes dull under such treatment and fails to perform its function perfectly. The proper adjustment of the pressure on the doctor blade depends on three things:—

1. The preparation of the edge by the printer;
2. The nature of the printing color;
3. The style of engraving.

In the first place a good cleaning edge should need very little pressure to help it in its work and if a printer takes trouble here (as has been pointed out) he need not fear so many of the other troubles that will crop up from a bad edge.

So many factors enter into the second question that only long experience can guide a printer in his decision of what is the right amount of pressure for each individual type of color. A doctor blade that has too much weight on, when a starch-tragacanth color is being used, will be inclined to lift the color out of the engraving. Such a color does not hold to the engraving as well as a gum mixing and for this reason it is necessary to exercise care in adjusting pressure on the rollers and doctor blades.

In the case of very light engraving holding very little color the same rule applies, little pressure being necessary so long as the blade has a keen, sharp cleaning edge. Let it always be borne in mind that excessive pressure is worse than useless where the edge is not as nearly perfect as it is possible to make it.

To illustrate this latter point an instance is here quoted. A printer complained of color giving trouble. It was strained again without noticeable improvement. After a time when everything else had failed the doctor blade was examined and the edge was found to be still rough and unfinished. Small rough particles of steel left after filing still adhered to the edge. A thorough honing soon set matters to rights and the work proceeded, without further trouble. The printer had either forgotten to hone his blade or had deliberately neglected his work.

Collaboration in Other Departments

In other departments this collaboration must be carried on in a similar manner. Between the machine shop and the ageing and steaming departments for instance, there must be continual reports of damage and likely causes of damage so that such may be checked on its first appearance.

Goods may be ruined for ageing or steaming before ever they leave the printshop merely by inattention to proper drying. In the first place, goods, especially in vat colors, must be thoroughly dried. Secondly, they must not be overdried or "baked" in printworks' language. The first fault leads to marking-off and springing of the colors; the second to uneven and undeveloped colors. The best possible drying is obtained by means of a series of drying cylinders consisting of not fewer than twenty-four tins. This allows of a gradual bringing of the goods to a perfectly dry condition and does not bake them as would be the case with a short range where the drying would be done much too quickly to give satisfaction in this respect.

Other faults which, though they may not occur in the printshop, are noticed more readily there than anywhere else are burst ends and torn selvedges. These if allowed to proceed without comment may lead to very serious damage in the ager or continuous steamer. It is the duty of the boys behind the machines to take note of all such cases and report them immediately, so that they may be remedied by removal of the damaged part and a fresh seam put in. With regard to this last operation, it should not be left to an inexperienced lad, but a proper straight seam should be put in by an experienced sewing hand.

Crooked seams give rise to creasing in the ager, and if this takes place in a discharge pattern, marking-off is sure to result and, what is worse, cannot be remedied in such styles. A burst end or torn selvedge in the ager or steamer can cause a really serious amount of damage, as in the case now to be described.

A pattern printed in chrome mordant colors became torn slightly at a selvedge and passed on to the ager unnoticed. The small loose end became caught on a spindle and tore the selvedge of a number of pieces just at the last of a run. Next came along a large run of vat printed goods which were run after the ager had been cleared of chrome prints. After this again came a further run of chrome goods. All went well apparently until the last-named goods were washed off, when it was found that a portion of the pattern all down one side right through the run had been partly discharged, seemingly by the action of a reducing agent. The cause was discovered when on cleaning the ager rollers, a large piece of the torn selvedge had been left wrapped round one of the rollers. The selvedge was from the chrome mordant goods which had first been aged and the ager man not having time had left it wrapped round the roller, cutting off only loose ends and making it so that other goods could not catch. This selvedge being still there when the vat goods were run through became through time coated with a mixture of vat colors containing Hyraldite which became quite soft under the prolonged influence of moist steam.

Being by this time almost forgotten, the next batch of chrome mordant goods was run through, after the ager has been cleared of hydrosulfite fumes, with the consequences detailed.

Had the affected chrome color been resistant to hydrosulfite all would have been well, but as it happened it was one that was fairly easily dischargeable and hence became easily damaged in the manner described.

Creased selvedges should also be reported immediately as such a crease entering the guiding bars at the front of the ager is very liable to get worse and perhaps cause creasing right through a whole run. If the pattern concerned is printed in vat or hydrosulfite discharge colors a mark-off is sure to occur with disastrous consequences. Again a turned-in selvedge may occur at the delivery end of the ager and if this passes unnoticed or is not reported through carelessness, the goods will go on to the washing-off processes and again marking-off will occur in the case of basic hydrosulfite discharge styles, in the nips of the open soaping range during developing.

Great care should be taken by printers and ager hands to ensure that the goods do not get any water drops before ageing. These drops cause damage that cannot be repaired as the color at such parts is almost wholly destroyed. Drops inside a well constructed ager are of rare occurrence, but where such do occur it has been suggested that, especially in ageing aniline black, the emerging goods should be led back across the top of the ager, so intercepting any drops that might happen to fall. The aniline black being by that time fully formed it is not any longer destroyed by the water drops and hence serves as an effective shield for the undeveloped black just entering the chamber.

Very often at the close of a day there remain only a few pieces of say a vat color pattern to be printed and aged to finish the day's work. In such a case the printer needs to collaborate with the ager man so that the latter is not forced to stop the machine to wait for prints. Instead of washing up all his color boxes in this case before running the end of the batch over the drying tins, the printer should do so immediately so that no time may be lost. The object of course in washing up before running the last end over is to save color and back greys, but in this instance any such saving is small compared with the other risks involved.

To stop an ager during a run of vats always results in damage, in the nature of unlevel colors, no matter how much care is taken in turning steam off, etc. It is just in such instances that collaboration or the lack of it between departments will make or mar the work in hand.

(Continued on page 154)

PROCEEDINGS OF THE
American Association of Textile Chemists and Colorists

MARCH 12, 1934

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STANDARD SILK SAMPLES

There have been prepared, under the direction of the Sub-Committee on Fastness of Dyed Silk, standard dyed silk fabrics to represent four classes of fastness to washing—namely, Class I, Class II, Class III and Class IV. These standards have been carefully dyed with the dyestuffs and according to the dyeing methods recommended in the 1931 Year Book.

The A. A. T. C. C. is prepared to furnish sets of these washing standards for a nominal charge which will cover the cost of preparation. It will be possible to accurately grade the fastness by comparing it with the standards after subjection to the standard washing tests approved by this Association. All inquiries concerning these Silk Washing Standards may be addressed to the Chairman of the Research Committee.

Louis A. Olney,
Lowell Textile Institute,
Lowell, Massachusetts.

Analytical Methods for a Textile Laboratory

The Council of the A.A.T.C.C. believing that Dr. Scott's series of articles entitled "Analytical Methods for a Textile Laboratory" might well be brought together in book form, have proceeded with its publication. The book contains 80 pages, and is of handy size for use in the laboratory. They may be obtained from the Secretary of the Association for 75 cents.

Proceedings of the American Association of Textile Chemists and Colorists

Indigosols*

By **F. EMIL SCHULTZ**
Carbic Color & Chemical Co., Inc.

THE name (or term) Indigosol was first used to designate the product made from synthetic indigo according to the process patented by Bader & Sunder and assigned to Durand & Huguenin of Basle, Switzerland. This patent, and the subsequent related ones, provide for the sulfonation and esterification of indigo and other vat colors.

The original indigosol, which was first called Blue Salt DH, then Indigosol DH and finally Indigosol O, was followed from time to time by others, till now there are 26 indigosols on the market, comprising practically a full range of shades.

The list includes indigosols made from the indigoid and anthraquinone series of vat colors, those of the Indigoid series predominating as those were at first found the easiest to convert.

Not all the vat colors were found suitable for this process, some gave such poor yields that they were not commercially practicable, others gave good yields but could not be oxidized back to their original color, and still others proved very unstable and could not be kept for any length of time. Indigosol Green IBA proved quite unstable in powder form, but kept very well as a paste, and is delivered in this form.

With this exception all the indigosols are in powder form, are practically colorless, and are soluble in water.

When dissolving the indigosols the solutions must not be boiled, nor can strong mineral acids be added to the solutions, precipitation occurring in either case. However, in wool dyeings, small amounts of mineral acids, preferably in the form of their ammonium salts, can be added, and the dyeings can be boiled after the usual slow heating of the dyebath.

Wool Dyeing

In wool dyeing with Indigosol O and OR the dyebath is started with the dissolved color, a small amount of Rongalite C to prevent oxidation, Glauber's salt, acetic and formic acids. The dyeing is started at about 100° F., slowly raised to a boil and boiled one-half hour, then exhausted by the addition of 1-2% sulfuric acid and boiled three-quarters of an hour longer. When dyeing on Alizarine Red and Blue grounds the sulfuric acid is omitted, as this destroys the ground shade.

After the dyeing and rinsing the color is oxidized either with sulfuric acid (3 pints per 100 gal. liquor) and chrome, or sulfuric acid and nitrite of soda, for three-quarter to 1 hour, starting cold and raising to 75-120° F.

The nitrite of soda gives somewhat brighter and redder shades.

The remaining indigosols are dyed by dissolving the color, starting the dyebath cold or at about 100° F., with the addition of 5% sulfate of ammonia, raising slowly to the boil, boiling one-half hour, adding 1-10% acetic acid, and boiling one-half to 1 hour till exhausted. After dyeing and rinsing the colors are developed in a bath of sulfuric acid (3 pints per 100 gal. liquor), sulfocyanide of ammonia 1-3%, and bichromate of soda three-quarters to 3%, according to the depth of shade.

The sulfocyanide of ammonia acts as a buffer to prevent over-oxidation, avoiding any damage to the shade or the fiber, while allowing full oxidation of the color.

The oxidation is started cold, raised slowly to 185-190° F., and kept at this temperature for about one-half hour.

After the oxidation by any method the goods are well washed, and if necessary neutralized with soda ash or ammonia. We prefer soda ash.

Fastness to Rubbing

To improve the fastness to rubbing, particularly with Indigosol O and OR, 2-4 parts Indigosol Soap SP should be added to 1000 parts developing liquor, and the nitrite of soda is added slowly after putting in the SP Soap, say in small portions taking 10-15 minutes for the addition, then the developing takes three-quarters to 1 hour cold.

As the proper shade and depth of the color is only apparent after completion of the oxidation, a method has been developed for the rapid oxidation of sample swatches, which gives results very close to the ultimate ones, making possible the matching of shades.

*Presented at meeting, Lowell Textile Student Section, Feb. 7, 1934.

Once the proper formula is established for a certain shade, the subsequent dyeings run remarkably true to shade; and additions are rarely necessary.

The time consumed in dyeing is about the same as for afterchrome colors.

Combinations

Indigosols can be used in combination for the lightest of shades such as pearls, greys, lavenders, tans, etc. They are level dyeing and give excellent penetration. The usual precautions for preparing the stock for dyeing are taken.

Application

Indigosols can be applied to raw stock, slubbing, yarn and pieces, though so far pieces have only been done experimentally.

They can be dyed in the Abbott or other regular top dyeing machines and raw stock tubs.

Various difficulties in dyeing, owing to dyers being unfamiliar with these comparatively new colors, have been overcome through their cooperation with us. We have found it advisable to make slight changes in the dyeing formula to meet conditions at each plant. This, however, is an accepted dyehouse condition.

Cotton

On cotton the indigosols with a few exceptions, show practically no affinity for the fiber, the application therefore consists of printing, padding, or impregnating in a kettle or dyeing machine, drying in some cases and development by steaming or a passage through an acid developing solution.

The steaming method provides for the addition to the color of chlorate of soda, sulfocyanide of ammonia and vanadate of ammonia, similar to the Aniline Black process, and ageing or steaming to develop, a second method is to make up the color with a chromium salt, and steam or age in the presence of acetic and formic acid vapors, with a subsequent aftertreatment or weak sulfuric acid and chrome.

The acid development processes are the nitrite process, in which nitrite of soda is added to the color and the impregnated or printed goods are passed through a sulfuric acid solution; the chrome process, in which the impregnated or printed goods, are passed through a solution of sulfuric acid and chrome, and the ferric nitrate process, in which chromate of soda is added to most of the indigosols (the balance do not require it) and the impregnated or printed goods passed through a solution of ferric nitrate and sulfuric acid for development.

Viscose

Indigosols have also proven very satisfactory on viscose (rayon) in a standing bath in light and medium shades. When dyed in a Smith-Drum or similar machine full skeins can be used and the wind-offs are perfect.

The indigosols on viscose are developed by nitrite process, and a large range of shades can be made that will stand chemic.

As the indigosols do not exhaust it is advisable to keep standing baths except in the case of the lightest shades. The exhaustion of the dyebath varies, the pinks and reds exhausting relatively less than the other colors, and additions to the dyebath must be made accordingly.

Block and Screen Printing

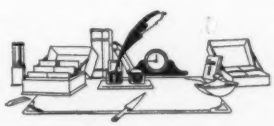
The indigosols are also useful for block and screen printing. They can be printed on mixed fabrics such as cotton warps with wool filling, and cotton warps with wool and viscose silk filling. The fabrics are either block or screen printed, dried, steamed for 20 minutes without pressure and then developed in a solution of 4% sulfuric acid 66° F., 4% ferric nitrate, by volume at a temperature of 176° F. for 1½-2 minutes. Wash well and neutralize with soda ash, extract, dry and finish.

MEETING OF LOWELL TEXTILE INSTITUTE STUDENT SECTION

ON Wednesday, February 7, 1934, F. Emil Schultz of the Carbic Color and Chemical Company gave an interesting talk on the Indigosols before the Lowell Textile Institute Student Section. Mr. Schultz showed a number of dyed and printed samples that were produced with the Indigosol dyes. The methods used in dyeing and printing were also demonstrated. The paper given, in part, precedes this report.

Respectfully submitted,

CHARLES L. DALEY,
Secretary



Proceedings of the American Association of Textile Chemists and Colorists

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the secretary any vacancies which may occur in their businesses.—A. Newton Graves, Secretary, care Franklin Process Company, Providence, R. I.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive

Note. Persons who have obtained employment should notify the secretary at once. Prospective employers may file vacancies either with the secretary or the American Dyestuff Reporter.

A-2

Education—B.T.C., Lowell Textile Institute, 1932; also course in shorthand and typing.

Experience—None to date, interested in quantitative analysis, experimental dyeing, color matching, dye testing and dye identification. Ability to learn quickly and will go anywhere. 23 years old, single.

A-5

Education—B.T.C., Lowell Textile Institute.

Experience—Assistant chemist in carpet mill, dye tester in dye plant, research and analytical work in silk dyeing and finishing plant laboratory, plant chemist and overseer of bleaching in surgical dressing plant, assistant chemist in woolen mill. Age 29. Married.

A-B-2

Education—Lowell Evening Textile School, 1917.

Experience—Five years' experience in hosiery dyeing, full fashioned hosiery of silk and cotton and silk, also men's hosiery containing rayon, wool, cotton and celanese. Several years experience in laboratory work. Has also had experience in jig-dyeing of cotton piece goods, slub and top dyeing.

A-B-C-1

Education—Graduate Industrial Chemical Engineer, Pratt Institute—1911.

Experience—One year as plant control chemist, 4 years as laboratory chemist with gas company, 13 years as plant chemist with bleaching, dyeing and finishing plant. (Rayon and cotton piece goods). Formulated processes and put them into plant operation, 1 year as chemist and demonstrator for dyestuff company, 1 year as superintendent colorist with print works printing linen and rayon, 1 year as director of testing laboratory for national dry goods concern.

A-E-2

Education—B.T.C., Lowell Textile Institute, 1933.

Experience—Assistant instructor in chemistry, Lowell Textile Institute. Member of scholastic honorary fraternity.

A-E-1

Education—Ph.D., Univ. of Illinois, studied chemical engineering at Columbia, licensed chemical engineer, New Jersey.

Experience—10 years' experience teaching in colleges, subjects included chemical and textile subjects. Has had broad experience in industrial work including experience in testing materials, research and consulting. Will go anywhere; references.

B-1

Education—Educated and trained in chemistry and calico printing in Glasgow, Scotland.

Experience—Has been with large print works as colorist for 13 years producing first class work on cotton, rayon, wool and silk fabrics. References.

B-2

Experience—Boss dyer with one firm for 18 years, divisional supt. at print works for 1 year, in charge of processing and dyeing of cottons and rayons at large bleachery for 6 years. Prefers bleachery in East but will go anywhere. References.

B-3

Experience—Foreman piece dyer for the past 21 years. Can dye the following; celanese, rayon, cotton backs, wool, silk and mixed fabrics. Has knowledge of finishing and laboratory work.

B-6

Education—Graduate R. I. School of Design.

Experience—5 years in bleachery, 7½ years as assistant dyer, 2 years as boss dyer and 3 years as superintendent of dyeing and finishing. Married, 33 years old. References.

B-7

Experience—Eight years as boss dyer on skeins and ribbons. Over ten years as chemist and head dyer for a large hosiery mill. Experienced on Silk, cotton, rayon and wool in skeins, ribbons, piece goods and all kinds of mixtures. Willing to go anywhere. Not afraid to work or face responsibility. Can handle help efficiently.

B-8

Education—Chemistry and Dyeing Department, Philadelphia Textile School.

Experience—Eleven years experience as chemist and boss dyer on the following: woolen, worsted and cotton

(Continued on page (71) 151)

Proceedings of the American Association

Textile Microscopy Advances*

By **EDWARD R. SCHWARZ**

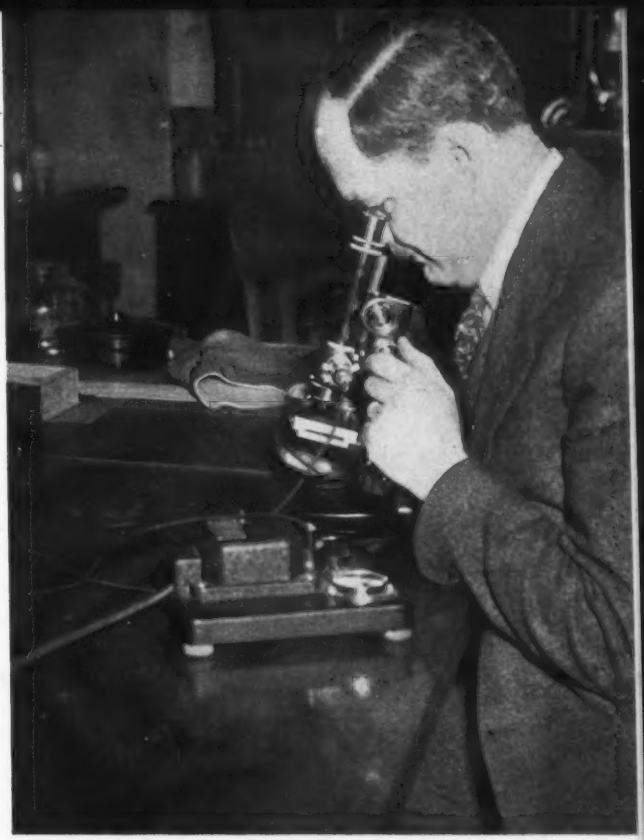


Fig. 4—Ultropak Microscope in Use for Textile Analysis.

DURING the past few years the growth of textile microscopy as a somewhat specialized branch of textile technology has been rapid. Recent developments in this field should be of immediate interest to anyone engaged in any of the technical aspects of textile manufacturing. Not only in the means for recording observations through the microscope has progress been notable, but also in the development of instruments and accessories, and in the various newer techniques resulting from increased application and use of optical equipment.

For the recording of the results of microscopical observations the micrograph or drawing and the ordinary photomicrograph have become very familiar. Even the application of direct color photography for the production of photomicrographs is no longer novel. As usually applied, however, these methods fall short of complete success. They do not adequately render the depth of the specimen be it fabric, yarn, or fiber. This depth or third dimension is important in any textile material and so the development of stereograms made through the microscope is of increasing interest. It is now conveniently possible to prepare stereoscopic photomicrographs with the stereoscopic microscope, the usual mono-objective microscope or even with the simple micro-tessar lens in the camera without the aid of the microscope at all. The latter method is of particular value for the study of fabrics and novelty yarns. In many cases the use of a fabric calls for a certain amount of distortion of the goods—as with a braided material applied to a core. Just how the structure of the fabric is altered by the stretching and what the conditions of service are can therefore be conveniently recorded in a stereogram. A short discussion of certain methods in this connection will be found in the AMERICAN DYESTUFF REPORTER[1].

For many years the police departments of the country have been using a system of fingerprints for the identification and record of criminals. It has only been recently appreciated that fingerprints, if we may call them such, can be taken of fibers and fiber elements for study under the microscope. Hardy[2] points out the application of a principle of casting fibers in celluloid to problems in wool fiber research. Where the fiber is heavily dyed or pigmented, the surface structure—particularly the number, spacing and size of scales—is difficult, if not impossible, to investigate. In the study of several types of fiber it is essential that the internal details of structure be differentiated positively from those which are external. The internal detail is very effectually eliminated by the casting technique, and by this means the nature of certain markings on bast fibers (particularly flax and ramie) have been definitely shown by Osborne[3] to be physical fissures.

The use of models of structures visible only through the microscope in biological and botanical sciences as well as in physiology is well established. The series of "Jewell" models of biological forms is standard teaching and research equipment. Very little attention has been paid to this method of recording detail of structure for tex-

*Abstract of a paper presented before the Northern New England Section, January 5, 1934, at the Masaschusetts Institute of Technology.

**Assistant Professor of Textile Technology, M. I. T., Fellow of the British Textile Institute.

Fig. 1—Celluloid Cast of a Portion of a Flax Fiber Cell. *Osborne*

tiles. It is possible to show not only the grosser details of fiber structure—such as the surface of wool fiber, for example,—but also the intimate details of structure found in the ultimate cells of plant fibers. At the Massachusetts Institute of Technology textile laboratory there is the start of such a series of models, which it is hoped will be developed from its present modest beginning to a worthwhile collection. One of these is a wool fiber so magnified that if it were completed to the same scale it would be quarter of a mile long. Another is a model of a portion of the ultimate cell of a typical bast fiber such as flax. (Fig. 2). This is several inches in diameter and

Fig. 2—Range Scale Model of Portion of Ultimate Cell of Flax Fiber.

about one foot long, protected by means of a glass case. Cards carrying descriptive captions and photomicrographs are connected by cords to the corresponding portions of the model. At the upper surface a portion of the model is cut away and the internal fibrillar structure is shown still further enlarged. The scale of the cell as a whole is such that, if it were complete, it would be thirty feet long. The use of X-ray equipment to produce diffraction patterns showing the lattice structure of cellulose, fibroin, etc., have made popular the so-called space or atomic structure models which illustrate vividly the concepts of submicroscopic structure. Astbury[4] gives excellent illustrations, both diagrammatic and photographic of such models and points out their correlation with micro analysis.

Many operations performed under the microscope lenses involve not only third dimension but also a fourth dimension, namely—time. The rate at which certain physical and chemical changes take place in microscopic objects is often of considerable interest and importance.

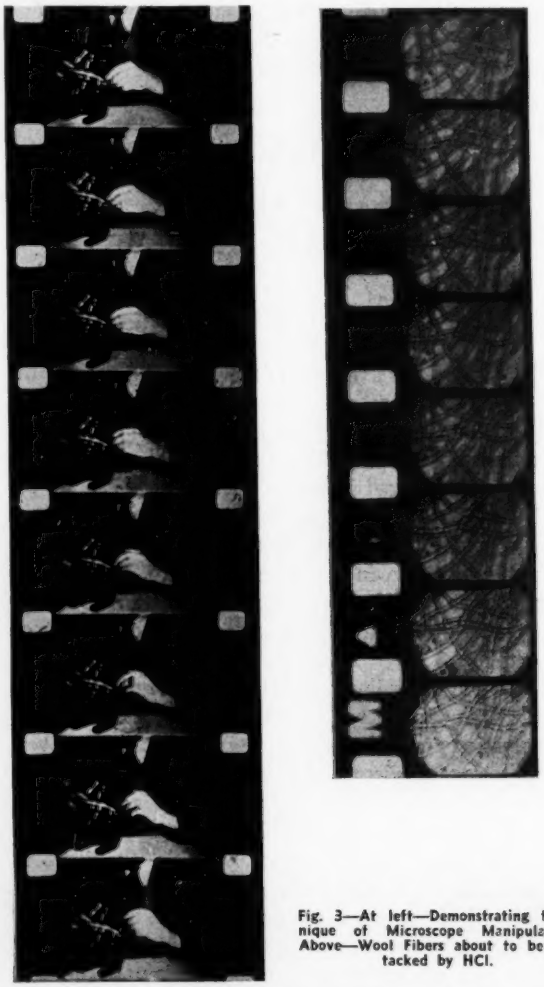


Fig. 3—At left—Demonstrating technique of Microscope Manipulation. Above—Wool Fibers about to be Attacked by HCl.

Swelling methods have been reported[5] for the purpose of differentiating elements of fiber structure and for the disintegration or micro dissection of fibers. It is not possible to stop such action once it is started for the purpose of record. Even the time required to take a photograph requiring an exposure of no more than one-fiftieth of a second is too long for the required result. The answer is evidently the adaptation of motion picture technique to the study of these questions. Film may be passed at any desired speed by the lens of the motion picture camera after the latter has been properly placed in relation to the microscope, and a series of photomicrographs will then be recorded thereon. Since the time interval be-

tween individual pictures is known, the rate at which certain measurable changes in the fiber take place can be determined.

A further application of motion picture photography to textile research is from the educational standpoint. The details of technique can be shown in a moving picture in a way which is both time-saving and relatively inexpensive. Close-up shots, repeats, cutbacks, slow motion, and all the other "tricks of the trade" may be employed to advantage. Either a running verbal comment, explanatory of the film by the lecturer, or the proper insertion of concise titles serves to make clear the details of technique illustrated. The author uses such films, prepared by himself, in the regular instruction work in textile microscopy and technology and for general lecture purposes. It should be possible eventually to add sound, and to have the lecture delivered in perfect synchronism with the pictures.

The outstanding development in microscopes for textile work is to be found in the utilization of an improved type of illumination which may be conveniently added to almost any normal stand, but which is most efficiently employed on a stand of the metallographic type (an instrument with a vertically adjustable stage). (Fig. 4). The usual vertical illuminator of metallographic fame is not suited to textile work because of the inadequacy of the reflected light from the textile material. For work with polished surfaces it is very satisfactory. A more intense and better controlled illumination is essential for work with fibers and fabrics. In the newer form the light is sent into the tube of the microscope at right angles with its axis and slightly above the usual nose piece, where it is reflected by means of an annular mirror or prism as a hollow cylinder of light, surrounding but not entering the housing of the objective lenses. The light as it descends is passed through a series of annular lenses which act as would the usual condenser found in the substage equipment of the regular microscope. The source of light can therefore be focussed on the surface of the specimen, (Fig. 5) and critical conditions obtained. Since no light passes down through the objective (as in the older systems) there is no interference between the ascending and descending beams. Powers up to and including the oil immersion (100 diameters initial magnification) are obtainable. The equipment is moderate in cost and allows the textile microscopist to better investigate the intimate details of surfaces than he has ever been able to do before. The use of such illumination in connection with various forms of higher power stereoscopic photomicrography will at once be evident.

Schwarz

Fig. 5—Fungus Growth on Cotton as Seen Through the Ultropak Microscope.

The polarizing microscope of the chemical type, on which a number of textile type microscopes have been based, is still an efficient means of studying textiles by this special form of lighting. However the use of the improvements and conveniences afforded by the petrographic type of stand will appeal to the worker who does any considerable amount of work with polarized light. Such additional accessories as the bi-quartz compensator for the production of contour diagrams direct on the fiber[6] together with the possibility of use of such micrometric devices as the filar micrometer, etc., make it very satisfactory. The particular advantages afforded are that the objectives are independently centerable, and that the stage while rotatable is permanently centered. Thus objectives may be rapidly interchanged at will without having to re-center them or the specimen. The presence of a body tube rather than a cap analyzer is also a convenience, although the cap analyzer is furnished and can be employed whenever desired—as with the bi-quartz compensator already mentioned. It should be stated that chemical stands are now available with body tube rather than cap analyzers and this is the preferable form for textile work.

Accessory devices also have been improved and adapted to new uses. A so-called capillary rotator has been available commercially for some years. It is essentially a chuck mounted on a slide so that it can be conveniently placed upon the stage of the microscope. A very fine diameter capillary tube of glass into which the specimen can be inserted is held by the chuck so that it may be freely rotated horizontally about its axis. Means are provided so that by the use of a proper immersion fluid the glass of the tube can be made to practically disappear. Thus a fiber may be examined dry or mounted in any desired fluid at high powers for its entire circumference. Such a technique is of interest in refractive index determination for biaxial fibers, and in any such study as the placement and peripheral count of wool fiber scales for example.

Continuation of investigations of the applicability of microscopic equipment and technique to analysis of yarn structure including twist makes other pieces of accessory apparatus desirable. Since it is not convenient to mount the textile (or any compound microscope) in or on a conventional twist tester, so as to allow detailed quantitative study of the variation of measurable factors as the

yarn was twisted or untwisted, a small twist tester which can be used on the stage of the microscope has been built. Thus important and interesting developments in this field may be expected shortly.

Not only are new and improved accessory devices continually coming into use, but techniques are being improved as well. In many instances these two phases of development proceed hand in hand. Witness the newer type of metal plate for rapid sectioning of fibers. Instead of a fixed diameter hole or a non-adjustable slit, the plate contains a slot into which a plunger is nicely fitted. Tangent to the slot at one end is a hole of sufficient diameter to allow the easy insertion of the fiber bundle or single fiber. After insertion the material to be sectioned is forced to the opposite end of the slot by screwing in the plunger. Cutting is carried out as usual. The advantages of this method over certain of the older techniques will be apparent to anyone who has used them.

New fields of micro endeavor in textiles also present themselves and call for improvement of both devices and method or the invention of new ones. Such a field is to be found in many phases of the problem of correlating optical and physical tests. The tester who breaks a steel bar in the laboratory is keenly and properly interested in the intimate details of the nature of the fracture. One of the first things he does is to note the appearance of the break in general and of the ruptured surfaces in particular. All too infrequently does the textile tester analyze the minute detail of the failure of his test specimen. Now that optical equipment including the slow motion movie, the stroboscopic camera and the microscope have been made readily available for his use, he should in simple justice to himself make use of them. Such work as that of Clegg[7] shows the practicability of such studies. It is hoped that they may be continued and greatly extended.

Textile microscopy is advancing rapidly and plays an increasingly important role in the service of the textile technologist. Whatever may be the case with the other phases of the textile industry, microscopy advances.

Discussion

Question: How do you use immersion liquids for refractive index measurement? Do you operate with a choice of liquids?

Answer: By means of several techniques it is possible in polarized light to determine when the specimen (fiber) is equal in index to the immersion liquid. By means of a refractometer, the index of the liquid, and consequently, of the fiber can be precisely determined. The liquids used should be colorless, of known dispersion, known index, non poisonous, permanent. They should not react with the fiber. These qualities limit the choice. We use certain organic liquids and fractional distillates of them in combination.

Question: Would the moisture content of the fiber be enough to make any difference?

Answer: Yes. Water (even in the form of regain from the atmosphere) swells the title fiber and alters the magnitude of one or more of its indices. Measurements would normally be made in the absence of water.

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Proceedings of the American Association of Textile Chemists and Colorists

Scientific Instruments*

Useful in the Textile Industry

By W. L. WEBB

Williams, Brown & Earle, Inc., Philadelphia

UNTIL comparatively recent years the possibilities of optical instruments as aids in textile production have had little consideration. In 1928 and 1929 a considerable awakening in this direction was apparent and despite the financial difficulties of the years since, progress in the leading companies has been steady, if regrettably slow.

Textile technicians have always felt that optical instruments were to be confined to the research laboratory. Attempts have been made to make the advantages of these visual aids accessible to production activity. Consequently, the textile concerns, whether large or small, have available certain standard equipment that can fit their needs no matter how simple, or for that matter, however complicated.

One of the most widely applicable is the binocular stereoscopic microscope. This instrument consists essentially of paired objectives and eyepieces arranged with erecting prisms and suitable mechanical adjustments. It is manufactured by all the leading optical companies both in the United States and abroad. The manipulation is quite simple and it is possible to view a comparatively large area of a cloth, up to one inch, with ease and clarity. The relation of one thread to another in the weaving is especially apparent due to the stereoscopic effect. Dissection under this microscope is simple and in the case of label manufacturers and others making similarly complicated fabrics, the instrument has been of very great value.

Stereoscopic pictures have been made with the aid of this instrument although there are now available stereoscopic cameras that do much simpler and more satisfactory work. These cameras are quite expensive and the resulting pictures, although interesting and valuable, are not as generally useful as a single picture due to the necessity of using a stereoscope for viewing them.

For photomicrography of specimens of similar size and appearance, involving depth of focus and resolution, to those seen under the binocular microscope a series of highly corrected short focus photographic lenses have been developed. These lenses used with a photomicrographic camera enables one to make pictures ranging in magnification from one to forty times. Expert advice should be secured as to the particular lens required for the work you may intend to do, as it is easy to secure the wrong lens due to the change in size of field and depth of focus with increased magnification.

The monocular microscope of the type especially recommended for textile use has far too wide an application to even be touched upon. An instrument of this type should be in every textile laboratory in order to meet various problems as they arise. Some very good articles by Prof. J. H. Skinkle and Prof. E. R. Schwarz, covering the use of the microscope have been published in the AMERICAN DYESTUFF REPORTER and the "Textile World." Particularly interesting and instructive is a series of some ten articles entitled "Don't Be Afraid of the Microscope" by Prof. Schwarz, the first of which was published in the "Textile World," April 27th, 1929.

One of the newest developments in using the monocular microscope is the application of polarized light. The various textile filaments show characteristic color effects between the crossed nicols in the polarizing microscope and color effects are also evident with changes in the condition of particular filaments that have been subjected to manufacturing operations. This type of investigation is so new that little definite information is available, but it is evident that great possibilities of valuable discoveries exist.

The same photomicrographic camera previously mentioned can be used in securing pictorial records of any of the phenomena observed by means of the microscope. A less expensive method of recording such information is available in the use of a Camera Lucida that enables the observer to trace the microscopic pictures while observing it through the microscope.

The Hydrogen-ion Colorimeter is of interest due to the universal prevalence of problems involving alkalinity and acidity in process control. The hydrogen-ion concentration of baths used in scouring, dyeing and degumming is recognized to be of paramount importance. Many types

*Presented at meeting, Philadelphia Section, January 12th.

of defects are readily traced to the one source, improper hydrogen-ion control. The use of the potentiometer has often proved discouraging and consequently many textile plants are using very simple comparator equipments to do work that should be held to a much higher accuracy for optimum results. The hydrogen-ion colorimeter provides the means by which it is possible to obtain high accuracy, to two in the second place, with a minimum of inconvenience to the chemists. The equipment is also more reasonably priced than potentiometers of similar accuracy. The use of the simpler comparator instruments should not be discouraged as they are very quick and convenient and in many cases sufficiently accurate.

The use of projection as an aid to control is logically assuming an increasing important role. The silhouette projector enables the operator to show on the screen the outlines of a piece of woven or knitted material about three inches square at magnifications ranging from ten to twenty. The surface projector can be used in approximately the same way in showing surface defects. However, the instrument of greatest value is the combination of the two, called the Textile Projector. This complete equipment enables a group of people to observe silhouette and surface projection of a piece of fabric, or a combination of the two, at magnifications up to 80 times. This is especially valuable in enabling several persons to trace a particular trouble to its source. In knitted fabrics the twist and evenness of yarn, uniformity of stitch and coarse may be shown. The results of rough or worn knitting needles, sinkers, etc., are apparent. In woven goods, uneven tension, uneven twist and yarn diameter and worn or rough heddles and reed wires are evident.

The Toolmaker's Microscope, Ultra-Microscope, Fluorescence Microscope and Quartz Spectrograph all have their particular applications, mostly in the research field.

A research instrument of considerable interest is the Spectro-Photometer by means of which true color values may be determined. Daylight or white light consists of a mixture of the spectral colors; red, yellow, green and blue. The color of anything depends upon the percentage of each of these elements that may be present. The Spectro-Photometer enables one to plot a curve showing the relative intensity of each. In no other way can a true and accurate measure of color be made. In the textile industry the possibilities are wide but certain limitations, including the cost of the equipment, has confined its use for the most part to dye analysis. Dyes can be identified and quantitative analysis of mixtures be made by means of this instrument.

The refractometer is of value in many ways but is proving of particular use in the investigation of textile oils as the highly accurate type of instrument, accurate to the fifth decimal place, of the Abbe type is so sensitive that the presence of any oil adulterants can be readily determined.

Difficulty of manipulation of the various instruments mentioned has been largely overcome by simplified mechanisms at least in those of widest application. The other major objection, that of cost, has been given an undue amount of consideration under the stringent economy orders that have generally prevailed. It is seldom that equipment of this class can be proved immediately profitable to purchase on the basis of financial return. It is evident in many cases that the first use of any single instrument has repaid its cost many times. In other cases the gains are too obscure to be given an immediate money rating. However, an investment in an optical instrument can always be considered permanent as, with reasonable care, it is good for an undetermined number of years.

The initial cost of an instrument is therefore practically its only cost and the value to be obtained from it will be apparent over a period of many years.

Discussion

Mr. Dohner: Is the colorimeter the same as the comparator?

Mr. Webb: The comparator is a simplified equipment. By means of that you are able to determine pH concentrations to 1/10.

Mr. Alkus: Mr. Webb, have you done any work recently on the refractive indices of finishes? The method is very much simplified by using selective liquids of different indices of refraction. You can pick out various substances very easily. There is a very simple way to determine the presence of either sodium or potassium in soap, etc. By simply adding hydrochloric acid and evaporating to get a group of mixed crystals. Then using liquids of special refractive indices and focusing either up or down, you can identify either alkali almost quantitatively. This is much easier than the direct method. It has been done with fabrics also.

Mr. Webb: It sounds very practical. I have heard of similar things, but this is news to me.

Mr. Alkus: There was a course given last winter by the American Chemical Society where we worked this out. There were about twenty who took this course, at Penn. We invented a little piece of apparatus which cost about $1.25 for getting indices of liquids without a refractometer.

Mr. Webb: To what accuracy?

Mr. Alkus: To the third decimal place.

Mr. Webb: That is a very common process in other industries to measure the refractive index of a substance by surrounding it with oil or other liquid very closely approaching it in refractive index.

You have a series of oils, say one of 1.4222 and another of 1.4224 refractive index. If, in focusing up on the one your refraction rings go one way, and focusing up on the other it goes the other way, it shows that your specimen is in between those two. I think that is correct. This is called the Becke line method.

Mr. Jordé: I would like to know how to take a cross-section of a pigment yarn?

Mr. Webb: One of the simplest ones I have been able to operate personally is to take a group of these yarns, thread them in a heavy needle and draw them through a cork. Then take a sharp razor blade and cut it off in thin sections.

Mr. Jordé: We are using egg emulsion right now. It is pretty successful, but I was wondering if there was anything better.

Mr. Webb: Not that I know of.

Mr. Etchells: I think there is a small steel plate made by Bausch & Lomb with small holes on it.

Mr. Webb: Yes, I gave up the idea of mentioning that because you get practically the same results from your cross-sectioning.

Mr. Etchells: It is much simpler by the other method. I use it all the time and I find it very effective.

The Chairman recommended that as the hour was late, the gentlemen interested continue their discussion further with Mr. Webb individually.

Immunized Cotton*

By **E. R. HOPKINS**

Munitex Corporation, Paterson, New Jersey

IF I tell you at the outset of this talk that immunized cotton is related to acetate rayon in that they are both esters of cellulose, that it behaves like acetate during dyeing, those of you interested in questions of dyeing and not already familiar with immunized cotton, will have an easily understood interpretation.

As a matter of chemistry—it is nothing more than cotton yarn, of whatever count desired—which has been esterified while in yarn form.

I take it you are familiar, at least in a general way, with the development of acetate rayon within a few years after the war. This, of course, was the practical application of esterifying processes to an already developed rayon manufacture.

The special dyeing properties of acetyl cellulose reawakened chemical interest in production of a material which would not look like an artificial fiber, which would not so easily saponify, which would retain the greater part of its strength when wet, and which last but not least—would be cheaper.

And there was also at that time what might be termed the economic need to produce multi-colored effects in piece goods without resorting to skein dyeing; the attendant delay in manufacturing from skein dyed yarn, the financial losses to be borne if considerable yardage was woven and the designer guessed wrong on the colors which would be in demand.

Of course, there was one method of doing this last—by the use of resisted silk—but this could not be utilized with any success in a cotton fabric which had to be kier-boiled, bleached and then perhaps mercerized.

So while the dyestuff industry as a whole and the manufacturers of acetate rayon in particular were working to produce dyestuffs to apply to this new fiber, other chemists were searching for methods of altering cotton yarn so that it would have a new chemical identity but have its usual outward appearance.

As a matter of record it was as early as 1904 that a patent was issued in Europe to the present I.G. for a treatment of cotton with acetic anhydride. As far as is known this process was never successful commercially.

Other attempts, beside chemical treatment of cotton, involved impregnation of the yarn with drying oils or the precipitation of metallic compounds. But the uncertainty of these methods and the fact that the cotton was likely to deteriorate through the re-agents used, soon led to their abandonment.

Progress was made through various stages including study of the action of carbonyl chlorides of aromatic acids on the sodium compound of cellulose (benzoyl, naphtoyl and phthalyl chlorides), although this line of research showed that compounds produced were readily saponified by alkalies and therefore would not have the stability needed.

*Presented at meeting, Philadelphia Section, January 12th.

However, by utilizing the acid chlorides of aromatic sulfonic acids—that is—sulfonic chlorides—in the presence of inert solvents; it was found that stable sulfo esters of cellulose were formed—comparable in permanency with the original cotton.

The choice of the suitable sulfonic chloride for this purpose could be made from among the following—ortho and para toluol sulfonic chlorides, naphthalene sulfonic chloride and analogous compounds prepared from substituted aromatic hydrocarbons, together with the chlor—brom—and nitro derivatives.

In practice, the para toluol sulfo chloride is used because of economy. This is a bi-product of saccharin manufacture.

It is not likely that chemical combinations such as the last mentioned may be carried out quantitatively on cotton yarn. Should this be attempted, there would be probable destruction of the cellular structure of the cotton.

The conversion of the cotton to alkalized cellulose must proceed so that esterification is produced in successive layers. Actually the outermost layers of the cotton are swollen by the alkali treatment and are in a condition where they readily react with the esterifying agent. The inner layers are to a large extent protected from this action and by a suitable regulation of the temperature, the reaction may be brought to an end at this point.

In this question of layers of esterified cotton and a core of natural cellulose, we have a physical distinction from acetate yarn which is of course a uniform material.

And the question of layers is no disadvantage to either the manufacturer using immunized cotton or the dyer processing it.

Analysis of commercial immunized cotton shows a content of approximately 1.9% sulfur. If we assume for cellulose the general formula $(C_6H_{10}O_5)_x$ this would indicate that for nine or ten $C_6H_{10}O_5$ groups, one para toluol sulfo chloride residue is present.

In 1924 the yarn was first marketed in Europe by Sandoz Chemical Works of Basle and introduced in this country two years later under United States patents controlled by the Munitex Corporation in Paterson, N. J.

The practical application of the immunization process to cotton consists in immersing and saturating the yarn to be treated in alcoholic caustic, hydro-extracting the excess and treating the then alkalized yarn in a solution of para toluol sulfo chloride in toluol.

At the close of this particular operation, the yarn is again hydro-extracted and then washed to remove remaining salts and solvent, dried and finished.

The yarn after immunization is less transparent or slightly opaque—whichever description you prefer, is less polished, is less hydroscopic and is somewhat thickened. It has also lost approximately 4% of its original strength.

It shows no less resistance, as compared with ordinary cotton to peroxide or chlorine bleach, boiling soap or mercerizing liquors. You can, of course, injure the immunization if you try hard enough but with the ordinary care normally exercised in a well regulated dyehouse, the yarn will do all said of it.

I should say that immunization is carried out on both natural and dyed yarn. Of course, when we speak of immunizing dyed yarn we must take into consideration the fact that the dyestuffs employed to dye the yarn before immunization must themselves be able to withstand the process. Various direct and developed colors do this and after immunization these dyestuffs are as fast as any vat dyed yarn. If the yarn is purposely treated to break up the immunization, the dyestuff immediately loses its fastness properties—but not until then.

Immunized cotton in the dyehouse may be treated as any acetate rayon would be. In that statement you have the kernel of all the methods of handling. If immunized cotton is used for striping in a woolen fabric, there is no danger of damage from scouring or fulling operations. If used in an all-cotton fabric, the only thing it won't stand is pressure kier boiling. The same purpose of boiling out may be accomplished by open kier work, of course without pressure. Combined with silk, there is no danger to immunized cotton, either natural or colored, from boil-off or bleach liquors, except from a highly alkaline bath and we all know that the silk fibre itself will suffer from that.

If immunized cotton is used in conjunction with rayon, that is, any type except acetate—there are no operations which will do it any harm. Cold caustic liquors, commonly used to remove sizing materials, have no effect as mentioned once before in connection with mercerizing.

Those statements cover probably every contingency except dyeing itself.

Everyone who has tussled with dyeing problems is aware that when effect threads are used in any fabric, it is necessary to select dyestuffs for coloring the main body of the fabric which will not at all or only slightly stain the effect thread. This is true whether the effect thread is viscose rayon in a worsted suiting, a finely mercerized cotton effect thread in a silk dress fabric or an acetate picot on an all-silk stocking.

This same principle holds good for immunized cotton and is the hurdle over which so many dyers stumble when they first handle fabrics or material containing immunized cotton. I realize that few dyers are anxious to change formulas but if the best possible result is to be obtained when immunized cotton is in the picture, then this selection must be made.

The list of dyestuffs which are best is unfortunately small—I speak here only of acid and direct colors because after all, those are the ones most used. There are a great many which only stain slightly and a result which is somewhat less satisfactory than the best, is easily obtained. Immunized cotton can also be used in fabrics to be dyed with developed, sulfur and vat colors.

Immunized cotton may be dyed by all those dyestuffs used for acetate yarn—including basic colors—although the latter find little application today other than for shading. It dyes a somewhat lighter shade than acetate yarn and consequently could be used in the same fabric with acetate, provided it is a very heavy shade to start with (supposing the acetate is to be dyed a light shade). If the acetate is to be left white then it can, of course, be any shade desired.

The cardinal principle in handling it is the same one which should be used in handling anything new in the dyehouse. Try it on a small scale first. Be sure of how it will act under practical conditions before plunging.

Of course, the chief value of immunized cotton lies first of all in the possibility of introducing it into a fabric where an effect thread is wanted on various colored grounds. It is far easier to weave in the grey and hold for dyeing orders than, as mentioned once before, weave from skein dyed yarn and perhaps guess wrong on the colors. Naturally enough, this same thing can be accomplished by the use of acetate in the same type fabric. But there are many fabrics—particularly novelties, where the manufacturer does not want to introduce any type rayon. This is entirely aside from the fact that weaving with immunized cotton is far easier than weaving with rayon.

Then again, immunized cotton, acetate rayon, viscose rayon and silk can be woven or knitted to produce anything up to a four-colored effect. It is understood that one of these colors is white.

I have here some samples of fabrics containing immunized cotton which I will be glad to pass around and which I hope will not become too inquisitive about Philadelphia. And any of you who have questions, I'll answer them to the best of my ability—although I ask you to remember that I had no hand in the original research work and what I have told you along those lines is a matter of record which I have simply brought before you.

Discussion

Dr. Pelikan: I would like to know something about the comparison of immunized cotton and acetate rayon. While both are supposed to be esters, it is known that the acetic acid ester of cellulose is not very stable if SO_3 is remaining combined in the acetate. Now, in immunized cotton we have an ester containing large quantities of SO_3 combined with toluol and cellulose. Is this product at least as stable as cellulose acetate? Since the immunized cotton is a toluol ester and the speaker referred to toluol as a solvent during the operation of manufacturing, is this product partly soluble in toluol or other solvents?

Mr. Hopkins: Immunized cotton is as stable as cellulose acetate. The acid question is generally taken care of in finishing. We introduce—I don't think there is any secret about it—we introduce urea to take care of any acid that may occur. As for the last item of your question, immunized cotton is not soluble in toluol or the usual solvents.

Dr. Pelikan: I would like to know the resistance of immunized cotton towards alkali. Which concentrations of hot alkali can be used without breaking down the ester? Are there any rules for proper pH values?

Mr. Hopkins: The whole question there is one of time. To illustrate, it is perfectly possible to dye fabrics with vat colors containing a natural immunized cotton and leave it white, and you will see in these samples that are here that some are left white. There, of course, you have a fairly rapid dyeing operation either on a jig or padding machine. You have a fairly high concentration of caustic as would necessarily be used in the dyeing of any vat colors. If you would take that same concentration of caustic and use it in a dyeing operation which would involve action of about two hours, you would tend to break the immunized cotton down so that you would not get a result which was comparable to that which you would obtain through jig dyeing or padding of cotton. Alkali will break it down gradually but not completely and the whole point of the thing is simply the question of time. I would say that ordinarliy with the amounts of caustic soda or potassium hydrate that you might expect to find in boiling operations in the dyehouse, you can run for a period of about two hours before you begin to break it down appreciably.

Mr. Sullivan: I understood Mr. Hopkins to say that yarn dyed with direct colors and afterwards immunized would have the same fastness as vat colors. May I ask what particular fastness you had reference to,—washing or what?

Mr. Hopkins: I have in mind any agent that you would want to use except light. There is no change in the dyestuff fastness whatsoever, as far as any washing, scouring operation, bleaching or anything else that you can conceive of. They are just as fast as any vat colors.

Mr. Gibbons: How does it compare in price with cellulose acetate?

Mr. Hopkins: I said before that originally the chemists had been interested in reproducing something which would be cheaper. That is an historical statement. I believe that at the time the research was begun on this, acetate was selling at something around $3. At the present time immunized cotton on an economic basis is absolutely out of the picture. You are able to sell or buy acetate yarn at approximately $1 or $1.25. The immunizing process alone is today worth $.80. I say worth it, and we get it. You must realize that is a novelty value.

Mr. Seibert: Mr. Hopkins, if direct colors which are normally dischargeable are immunized, is their discharged property affected in any manner?

Mr. Hopkins: That is a difficult question for me to answer exactly. They are less likely to discharge, but the question there is one of how strong you make the dis-

charge. Their fastness to any of the hydrosulfites is better on the immunized yarn than it would be if the yarn were not immunized. If you would take, let us say, some dye like Developed Black BH, which is one of the colors that we use in producing shades on yarn to be immunized, your fastness to discharge would be tremendously improved.

Mr. Seibert: My question refers principally to when the object is to produce a white or colored discharge pattern, not necessarily the stripping operation. In other words, let us assume that we had started with any dyestuff which is ordinarily dischargeable to a white. If it was immunized, woven as a stripe or pattern, would it still be as readily dischargeable in the average as before immunization?

Mr. Hopkins: I answer that generally by saying "no." It would not be as readily dischargeable, but you see your question is complicated by the fact that a great many of the direct and developed colors that are available on the market are not fast enough to the process of immunization to stand it, and therefore we do not use them.

Mr. Sullivan: Mr. Hopkins, would you say that immunized cotton would stand boiling longer than acetate rayon?

Mr. Hopkins: With the improvements that have been made in acetate at the present time I would not give a decision one way or the other. It would depend entirely upon the operation you were going through. There are times it would stand up better than acetate and there are other times it would break down. Acetate today is not as it was back in 1922 or 1923. It has been tremendously improved. I know of one dyehouse which dyes light shades on an all-acetate fabric at the boil, and feels that they can continue that boil for thirty minutes without endangering it at all.

Mr. Thomas: What kind of mercerizing do you use? Can you use the ordinary commercial type of yarn?

Mr. Hopkins: The only time I have ever known of mercerizing liquor interfering with immunized cotton was on one occasion when a very large bleachery decided to indulge in some hot mercerizing and we were absolutely pushed out of the picture.

Mr. Thomas: Don't you mercerize cotton first before you immunize it?

Mr. Hopkins: We do not care. Of course, the immersion in alcoholic caustic can be called a mercerization, but we don't care in immunizing whether we have a mercerized or unmercerized yarn. It doesn't make any difference to us.

MEETING OF PHILADELPHIA SECTION

THE Philadelphia Section held a meeting on Friday, January 12th, at the Penn Athletic Club, Philadelphia.

Following the usual routine business, as a tribute in memorial to our deceased members Raymond L. Burnett and Charles F. Credo, all present spent two minutes in silence standing, in response to that suggestion by our Chairman. The Secretary was also instructed to forward messages of condolence to the families of the deceased.

This was followed by the presentation of a prepared paper by Mr. E. R. Hopkins of the Munitex Corporation of Paterson, New Jersey, entitled "Immunized Cotton." Mr. W. L. Webb of Williams, Brown & Earle, Inc., Philadelphia, then presented a prepared address entitled, "Scientific Instruments Useful In The Textile Industry." Following his talk Mr. Webb exhibited a three reel motion picture, Eye of Science, illustrating the processing of the optical parts of instruments manufactured by the Bausch & Lomb Optical Company.

Interesting discussions followed both talks.*

Following a rising vote of thanks to our guest speakers, the meeting adjourned at 10:45 P.M.

Attendance 75

Respectfully submitted,

CHARLES A. SEIBERT, *Secretary.*

*See previous pages for papers.

APPLICANTS FOR MEMBERSHIP

(Continued from page (64) 144)

B. R. Harris—North Carolina State College. Sponsor: A. H. Grimshaw.

Joseph A. Porter, Jr.—North Carolina State College. Sponsor: A. H. Grimshaw.

E. M. Williams—North Carolina State College. Sponsor: A. H. Grimshaw.

Hyman Greenbaum—Lowell Textile Institute. Sponsor: Louis A. Olney.

Howard N. Stolzberg—Lowell Textile Institute. Sponsor: Louis A. Olney.

UNEMPLOYMENT REGISTER

(Continued from page (60) 140)

yarn; woolen, worsted and union piece dyes on both ladies' and men's wear; wool, cotton, shoddy and mohair raw stock. Age 33, married, will go anywhere. References.

B-9

Experience—Hosiery dyer with fifteen years' experience on high grade silk hosiery; familiar with all types of machines. Age 43, married. Will go anywhere.

B-10

Experience—Ten years in top dyeing for fancy men's wear trade, knitting trade and sports wear; also piece dyeings on men's wear, crepes, sports flannels and tropical suitings; also several years association with commission dyeing trade doing tops, worsted skeins, cotton skeins, piece dyes, peroxide bleaching, naphthols, mohair plushes and imitation caracul cloths. Familiar with many types of machines. 38 years old, single with dependents.

B-11

Education—B.T.C., Lowell Textile Institute, 1926.

Experience—1 year dyeing raw stock with chrome colors, 6 years dyeing hosiery on all fiber combinations and cotton, wool and merino yarns in Franklin Process machines, several years experience in garment dyeing. Age 29. Married. References.

F-1

Education—Textile Institute, Alexander Hamilton Inst., Extension work at Brown Univ., working knowledge of German.

Experience—Has had executive departmental work with all types of textiles manufacturers. Acquainted with all types of textile machinery, dyestuff application, laboratory practice, cost methods, and checking methods and processes. References.

***Notice*:**

Persons listed in the

UNEMPLOYMENT REGISTER

should notify the Secretary as soon as they become employed.

A Fundamental

Study of

PRINTING PASTES

Preliminary Report (Project 6-33)

By SIVERT N. GLARUM

Research Associate, A.A.T.C.C.

will appear in the

March 26th issue

AMERICAN
DYESTUFF
REPORTER

LOUIS A. OLNEY, Sc.D.
Professor of Chemistry and Dyeing, Lowell Textile Institute
Directing Editor

NORMAN A. JOHNSON
Managing Editor

MYRON DREW REESER
Advertising Manager

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SELF-SUSTAINED RECOVERY

A. W. ROBERTSON, chairman of the Westinghouse Electric & Manufacturing Company, pointed out in a statement he made at the beginning of the year that the United States Government is spending three billion, three hundred million dollars on public works. In 1932 the American people, at the bottom of the depression, spent approximately four hundred billion dollars in the buying of goods and services. These figures are startling. Even taking into account the various processes of turnover taken by our public works dollars as they multiply themselves, appearing and reappearing in pay rolls in the purchase of materials, in consumer purchases, in retailer purchases, in wholesaler purchases, etc., etc., still this public works program of the United States Government amounts to only a small fraction of what Mr. Public Citizen spent in one year of depression.

If we study these figures for a moment we see how much more important individual and corporate spending is than Governmental spending. A 10% increase in what the consumer, corporate and individual, spends would amount to forty billions of dollars, or more than 10 times the amount the Government is spending on public works. A comparison of this nature shows definitely that the normal exchange of goods and services by persons and corporations is the base upon which business and business recovery must rest. Government cannot by spending or by law create good business. It can feed us and clothe us, perhaps, for a time but it cannot legislate prosperity.

Practically all spending is for future needs. We buy clothes to wear tomorrow. If we knew we were going to die tomorrow we would not buy the clothes, or at least we would buy only one suit. We build houses to live in tomorrow. We build ships to sail in tomorrow. The buying and selling of goods and services is stimulated or retarded by persons and corporations directly as they have confidence in the future. Unless tomorrow has a pleasing and definite outline we put off buying until we see its outline more clearly.

Now that NRA, AAA, CWA, etc., are swinging into action, the future is beginning to take a more reassuring form than it had a few months ago. In other words, we are getting used to the present, so that our tomorrow begins to take on the form of something we understand and for which we can plan. As this concept becomes more definite in our minds, and we gain confidence in this tomorrow, our buying of goods and services will increase, which means the end of the depression and better times for everyone.

The greatest problem facing the American nation is a test of its ability to call a halt in due time in connection with the vast expenditures by government, Henry H. Heimann, executive manager of the National Association of Credit Men, temporarily on leave as Director of the Shipping Board Bureau of the Department of Commerce, declares in his monthly review of business.

"All of the efforts of the Government," the credit head points out, "are centered upon keeping the recovery program going full steam ahead. The administration is banking on getting the wheels started and then having a natural momentum carry it along. As we look back, most all admit that up to this point our situation is immeasurably better, both psychologically and actually. At the same time nothing would be more foolhardy than not to realize that there is being built up at the present time a dole psychology, which will call for a display of courage early in the Fall of an unprecedented character.

"We cannot continue repeating these expenditures, and stern hands must hold firm to the decision that they are at an end when the recovery program is well under way. There will be a continuous clamor for public expenditures under the CWA and PWA programs, due to the psychology created. Each and every citizen must constantly keep in mind the need of supporting his government in resisting these demands and of influencing his government to resist them at the proper time. If our recovery is to be sound, these expenditures cannot continue indefinitely."

COLLABORATION IN THE PRINTWORKS

(Continued from page 136)

Yet another case where forewarning by the printer to the ager hands may result in the avoidance of damage, is found in the case of a skin gathering on the face of the printed piece especially in heavy blotch patterns containing solid masses of color. These masses on penetrating the cloth to the back grey, especially where fine cloths are in use, are sometimes transferred from the grey on to the drying tins again, with the result that the damp color falling on top of them lifts such accumulations off in the form of a "skin" as printers term it. This skin if allowed to remain will very probably come off onto the ager rollers and collect there to do further damage on the oncoming goods. If it happens to be a vat color so much the worse. The skin is more liable to collect on greys that have lost a good deal of their absorbent power through repeated washings in soap solutions. Most of this trouble may be avoided by using soda ash for washing greys with the several advantages that the greys are

(I) Kept in better condition i.e. more absorbent.
(II) Cleansed more thoroughly.
(III) The method is also cheaper, soda ash being more economical than soap.

When all has been done and every precaution been taken up to this point, it must be remembered that the goods are little more than halfway to the making-up room. After steaming and ageing there come developing, fixing, washing-off, clearing etc. in a very diverse number of ways, each of which holds pitfalls for the unwary colorist. To secure the best results the ager and soap-house men must be trained thoroughly to distinguish between certain colors, especially vats in the reduced state. This matter is worth a little attention. A colorist cannot be expected always to be on the spot and if two intelligent men, one in each department, are "put wise" to the little things that need to be known they will usually take a pride in their duties and try to keep each other right.

In the washing-off of hydrosulfite discharge goods on direct grounds care should always be taken to see that the lightest grounds are washed off first. If this rule is not adhered to, trouble may very easily arise by reason of the fact that colors e.g. Rhodamines will to a certain extent stain the wash water which will in turn stain the lighter grounds, no matter how much care is taken, altering the tone of them in some instances to something very far removed from the original. Where a color of the Rhodamine type is included in the combination of colors used, men should always be instructed to divide such a batch into several portions, washing a part of the batch with every fresh run till they are all washed off. In this way the risk of stained grounds is greatly minimized and if care be taken in the selection of the dark grounds to follow on during washing the trouble need not occur at all.

Hands in the washing-off end of the works should also be trained to be on the look-out for other colors which may give difficulty in developing, oxidizing, etc. The writer calls to mind one instance of a vat red which was difficult to oxidize. It gave splendid results when properly developed and exceedingly poor ones when not. One of the difficulties lay in the fact that it was often used in multi-color patterns which perhaps contained a certain vat blue very susceptible to over oxidization of any kind. This blue turned very green under such conditions, and in order to get over the difficulty in some instances a proportion of violet was added to overcome the greenish cast. Where possible however the best solution is to keep such colors apart and oxidize each according to its requirements.

In the printing of aniline blacks especially the rule of collaboration between all departments must be strictly enforced. One of the great difficulties (which is really nothing to fear if faced in the right attitude) in printing steam aniline black is its great susceptibility to tendering. To avoid this evil the writer's advice on the subject is to give them the quickest possible processing when they have once left the ager. Before ageing i.e. before the action of the formation of aniline black has commenced, there is no danger as there is no free acid being liberated, if the black has been prepared right and if the printer has not baked the goods on the drying cylinders. Once the goods have left the ager, however, the piled up goods are more or less saturated with free acid fumes and that too at a fairly high temperature, so that tendering is very liable to take place, if developing and washing-off are at all delayed. The only safe way is to arrange for a soaping range prepared with developing box (bi-chrome) sitting ready to wash-off the goods, immediately they leave the ager. The writer recalls a works where it was often the rule to age blacks before the dinner hour, allow them to lie all meal hour and start to wash them after perhaps a two-hour interval. The result was of course tendering, and those in charge could not understand how it happened, seeing that the goods had been "gassed" or run through ammonia vapor in the ager before being allowed to lie around.

Printers are often in the habit of allowing a piece of the printed aniline black to remain on the tins for a few minutes in order to develop it so that they can then see whether or not there are any damages in the nature of streaks, etc. If this is carried too far the black at this portion becomes tender and the result is probably a broken piece in the ager at a critical moment and the damaging of three or four pieces of printed goods. The best thing to do in order to avoid such an occurrence is to "sight" the black with Rhodamine, etc. so that the printers can

see damages without resorting to this expedient. The black should leave the drying tins a greenish yellow color showing that development has not started or, if at all, not sufficiently so to do any damage.

If for any reason whatever blacks have become tender either in printing or ageing reports should be made at once to the next department so that at least some precautions may be taken to ensure that damage is not done to a number of pieces through a tear perhaps starting and running for a considerable length before being checked. If a piece for instance splits in the ager for any cause it is impossible to see the damage at all till it reaches the emerging end when it is too late to save a large portion of the goods, amounting in many instances to three or four 80 yard lengths.

Developing and washing-off operatives must always keep a sharp look-out for holes in the cloth, torn selvedges, badly sewn ends, etc. so that none of these may catch in pins or spindles and so give rise to further damage.

Next, after developing and washing-off, comes the final processes of drying, clearing of whites, removal of damages, etc. and the actual finishing. To secure a steady output all processes leading up to and including these must be arranged well ahead of schedule so that any hitches at other parts of the works may not hinder the finishing, etc.

To treat first of aniline blacks. It is usual in patterns containing a good deal of white ground work to chemick all blacks very strongly for the removal of scums, streaks, etc. and the improvement of the general appearance of the whites. It is sometimes necessary to chemick twice and in such a case a good deal of chemick is dried into the goods. It is necessary therefore to wash out all such deposits and for this reason goods should not be chemicked unless they can also be washed-off again the same night or early next morning. Chemick thus left in goods for any great length of time, say over a week-end, would lead to tendering of the whites.

Another reason why all the deposits of strong chemic solutions should be washed out of the goods is that such deposits have very often the effect of precipitating certain finishes. To take a single instance: suppose a "soft" finish is required, the finisher may make an addition of oleine or turkey-red oil to obtain the proper handle, not taking into account the chemick left in the goods he is about to finish. The result is the formation of lime soaps after a prolonged period of running, with consequent spottiness and stickiness in the finish, leading in some cases to that most undesirable result the washing-off and re-finishing of the whole run.

Dingy whites are a constant source of worry to the finisher, who may make additions to correct the tone at the beginning of the run only to find as he progresses towards the end of it that the situation tends to worsen, because of the fact that the dinginess has been the result of a gradual accumulation of some excess color in one of the washing-off compartments. The effect thus obtained is a batch of goods with fairly clean whites at the beginning, arriving by slow degrees at the stage of dinginess with which little can be done.

On one occasion the whites of a section of the goods in a certain works were all coming up very yellow, in fact some were so bad as to have the appearance of being tinted. It was noticed that the worst cases were goods that had been strongly chemicked, while further chemicking seemed only to accentuate the trouble. On investigation it was discovered that certain goods were immune and that these were goods that had not been prepared in turkey-red oil. The bad cases were printed in alizarine colors, etc. which necessitated the turkey-red oil prepare. On examination by the chemist the oil in use was found to contain a very appreciable amount of iron, which on coming in contact with the chemick forms a light iron buff or ferric oxide, thus giving rise to the yellowish whites.

After this experience all deliveries of T.R.O. were carefully tested for iron, while on being informed the makers so improved the quality in this respect that the trouble ceased entirely.

NEW PATENTS

(*Abstracted by S. O. C. M. A.*)

Bleached Condensation Product of Carbohydrates and Crude Hydrocarbons. (Light colored tanning agents.) Alphons O. Jaeger, Mt. Lebanon, and Heinrich W. Witzel, Ingram, Pa., assignors to Selden Co., Pittsburgh, Pa., No. 1,941,475, Jan. 2, 1934.

Manufacture of Acyl-Benzoic Acid Compounds. (By the Friedel & Crafts synthesis; relates more particularly to dyestuff intermediates prepared by reaction between an acyl compound and a benzenoid compound in the presence of anhydrous aluminum chloride.) Bernard H. Jacobson, Charleston, W. Va., assignor, by mesne assignments, to Calco Chemical Co., Inc., Bound Brook, N. J., No. 1,942,430, Jan. 9, 1934.

Sulfuric Acid Ester of Fatty Acid Compounds of High Molecular Weight and Process of Making Same. (More specifically, comprises reacting, in presence of an excess of pyridine, ricinoleic acid with the addition product of sulfur-trioxide and pyridine; intended for use in the textile industry as penetrating assistant.) Hugo Siebenburger, Basel, Switzerland, assignor to Society of Chemical Industry in Basle, Basel, Switzerland, No. 1,942,577, Jan. 9, 1934.

Halogen Derivatives of Isodibenzopyrenequinones. (More specifically, mono-bromo-4.5.8.9-diabenzopyrene-3.10-quinone; dye cotton clear red shades.) Max Albert Kunz, Mannheim, and Karl Koeberle, Ludwigshafen-on-the-Rhine, Ger., assignors to General Aniline Works, Inc., N. Y., N. Y., No. 1,942,761, Jan. 9, 1934.

(Continued on page 157)

Washington News Letter

By **WALDON FAWCETT**

THE propaganda in behalf of permanency for the NRA adds a fresh note of insistence to the problem of enforcement of Code provisions. Particularly the attempt to outlaw design copying as constituting an unfair method of competition. Theoretically, the full power of the Code Authority in each design-dependent industry is behind the mandate which demands deference to established priority in design creation. But, practically, this responsibility emerges as the one phase of Code administration which will necessitate the setting up of more or less elaborate special reportorial machinery and police organization.

To a degree in noticeable contrast with the early stages of NRA planning, the idea of Code correctives for design piracy has caught the imagination of the builders of the later Codes. Scarcely a draft has been presented, this some weeks past, by any design-dependant industry but what has carried a mandate against the duplication, imitation or simulation of designs. But, with ornamental designs, as with trade marks, trade names, etc., the Codes are barren of any gauges of originality in design, much less any formula for patroling any protecting design preserves.

Faced more sternly, under the prolongation of the NRA, with the problem of enforcement of design privilege, NRA officials are turning for models to the textile field where, alone, concrete proposals have been advanced. Deputy Administrators who have given the most thought to the subject are known to look with favor upon the suggestion put forward by the Rayon and Silk Dyeing and Printing Industry. Supplementary to the dyers' mandate that no concern shall copy the design or pattern of another is the stipulation as follows: "The issuance to and possession by anyone of a United States Patent or of a registered certificate by the office or bureau approved by the Board of Trustees for the registration of designs, covering any design or pattern, shall be conclusive evidence of his ownership of such design or pattern."

No Hearings On Peyser Bill

No hearings have been scheduled on the Peyser Bill,—H.R. 7359,—the purpose of which is to amend the law relating to design patents by means of corrective provisions against design piracy. Members of the House of Representatives Committee on Patents, to which the Bill has been referred, are skeptical whether the Bill will be considered at this session. Promotional work on behalf of the Peyser Bill is being carried on by Mr. Henry Creange, sponsor of The Guilds of America Foundation, of which the design piracy project is a part. Incidentally, it may be mentioned that Senator Nye is expected to introduce in the upper house of Congress a Bill for national incorporation of the body which would undertake to introduce into the industrial fabric of the United States a "modernization" of the old Guild system, under NRA rules.

Centralization of Government Statistics

The present session of Congress has witnessed revival of the project to concentrate in the Bureau of the Census all statistical work for the various Governmental Departments and bureaus. Some time since the U. S. Bureau of Efficiency, after a year's study of the statistical set-up of the Government, reported that the cause of efficiency and economy would be served by consolidation. The recommendation has slumbered but is now revived in the Appropriations Committees owing to the large amount of statistical work demanded by the Department of Labor as now constituted.

Textile Investigations At Standards Bureau

Under the recommendations of the Bureau of the Budget there would be available for Investigation of Textiles at the National Bureau of Standards in 1935, the sum of $28,300. This is the same amount that is available for the fiscal year 1934. To textile men it must appear an unpleasant contrast to a normal allotment of $46,500 but, at that, the textile industry has fared better than many another in the horizontal cut made in the appropriations for the investigation of technical problems of mutual interest to the Government and to the engineering societies and trade associations. When the Bureau of Standards underwent its drastic curtailment there were certain activities which had to be supported at the expense of others. Notably was it necessary to continue the testing for other Government Departments in order to determine whether equipment and supplies purchased under Federal specifications conformed to the specifications. It has also been necessary for the Bureau to maintain its primary and essential service of calibrating thermometers, gages, weights, electrical, optical and mechanical measuring instruments in terms of the national standards when called upon to do so by scientific and industrial laboratories. The net result of the unbalanced economies has been to cut technical research to 12 per cent of that in 1932. The greater part of the reduction had to be met by a general curtailment of the scientific and technical research of the Bureau covering the development of new standards, the refinement of methods

of measurement, and the determination of physical constants and the properties of materials.

Progress In Textile Research

Despite the hardships of the past year, Director Briggs of the Bureau of Standards declares that the past year has witnessed tangible progress on several important investigations in the textile group. He refers to the determination, for two yarn sizes, of the effect of weave on the properties of the finished cloth. He declares that this work should now be extended to an intermediate size and combined with a study of the effect of finishing processes. Cited also in benefit to the dyeing industry is the location of the isoelectric points of silk and wool. Dr. Briggs hopes for much in eventual expression in definite terms as a result of the designing and construction of the two new machines for measuring the "handle" and "feel" of textiles. The Director, in his inventorying of practical results of research, has taken cognizance of the extent to which manufacturers are applying the method developed at the Bureau last year for evaluating the color of manila rope fiber. Indeed the textile record for the past twelve months shows several improved methods of analysis which have already been incorporated in Federal specifications and in the test methods of the American Society For Testing Materials.

To Study New Trends In Exports

A formidable new responsibility in research—or, more strictly speaking, day-to-day reporting, confronts the U. S. Bureau of Foreign and Domestic Commerce. The recent reorganization of the Bureau had been no more than completed when the staff was brought face to face with the necessity of revising its entire information—economic, commercial and financial—in the export field in order to reconcile the statistical and analytical picture to the altered and ever-changing international situation. New barriers to foreign trade have been erected in almost every country and their nature and character are changing from day to day. Foreign exchange markets likewise are subject to regulation and control in a new fashion.

The new objective of the Bureau organization is to enable U. S. exporters to carry on their overseas trade with intelligence and foresight under the shifting conditions. The Bureau is also undertaking to measure the force and direction of the new influences upon U. S. foreign trade which have come into play as a result of the National Recovery program. To that end it is proposed to set up a unit in the Economic Research Division to study the export situation with particular emphasis upon costs and selling prices. Being confined to export trade this will not duplicate the studies made by the Tariff Commission.

Another new project, with prospective reactions in the technical field, has been launched as a result of the request of the NRA that the Bureau of Foreign and Domestic Commerce cooperate in the development of a program of standard procedure for trade associations which may become a basis for their more efficient functioning.

NEW PATENTS

(Continued from page 155)

Production of Organic Products from 7.18-Stearic Glycol. (Valuable assistants for the textile and allied industries, in particular wetting, cleansing, dispersing and like agents.) Fritz Guenther and Karl Saftien, Ludwigshafen-on-the-Rhine, Ger., assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Ger., No. 1,942,812, Jan. 9, 1934.

Azodyestuff Containing A Nitrosogroup. (Obtained by combining in substance or upon a substratum a 4-diazo-N-nitrosodiarylamine compound not containing a sulfonic or carboxylic acid group with an arylide of 2.3-hydroxynaphthoic acid. The new azo-dyestuffs are insoluble in water and when produced on the fiber yield red to garnet to violet dyeings of a good fastness to chlorine and washing.) Leopold Laska, Arthur Zitscher, Wilhelm Christ, and Adolf Petzold, Offenbach-on-the-Main, Ger., assignors to General Aniline Wks., Inc., N. Y., N. Y., No. 1,942,865, Jan. 9, 1934.

Azo-Dyestuffs and Process of Making Same. (For example, comprises diazotizing the sodium salt of the ester from para-cresol and para-nitraniline-ortho-sulfonic acid in which the para-cresol nucleus is sulfonated and coupling with 2-amino-8-hydroxy-naphthalene-6-sulfonic acid; produce on wool or other animal fibers, such as silk or loaded silk, in an acid bath red to violet and blue tints particularly fast to washing and light.) Friedrich Felix, Basel, Switzerland, assignor to firm Society of Chemical Industry in Basle, Basel, Switzerland, No. 1,943,170, Jan. 9, 1934.

Compound of the Benzanthrone-Pyrazolanthrone Series and a Process of Preparing It. (Dyeing cotton blue, grey or green shades of generally very good fastness.) Karl Wilke and Josef Stock, Frankfort-on-the-Main-Hochst, and Fritz Schubert, Frankfort-on-the-Main-Sindlingen, Ger., assignors to General Aniline Wks., Inc., N. Y., N. Y., No. 1,943,710, Jan. 16, 1934.

Azo Dyestuff. (Further dyestuffs of the series described in U. S. Patent No. 1,901,390, dated Mar. 14, 1933, black azo-dyestuffs.) Richard Fleischhauer, Frankfort-on-the-Main-Fechenheim, Ger., assignor to General Switzerland, assignors to the firm Chemical Works, formerly Sandoz, Basel, Switzerland, No. 1,943,179, Jan. 9, 1934.

Arylamino-1-Hydroxy-Naphthalene-2-Carboxylic Acids. (Yield the following colorations when mixed with ferric chloride solution: dark green, violet and blue.) Leopold Laska and Oskar Haller, Offenbach-on-the-Main, Ger., assignors to General Aniline Wks., Inc., N. Y., N. Y., No. 1,943,872, Jan. 16, 1934.

Production of Anthraquinone Derivatives. (Particularly valuable dyeings on cellulose esters and ethers are produced by dyeing the said materials with 1.4-diamino-2.3-dialkoxyanthraquinones. When dyeing according to the usual processes, brilliant bluish-red to blue shades having excellent fastness properties are usually obtained.) Paul Nawiasky, Ludwigshafen-on-the-Rhine, Berthold Stein, Mannheim, and Arthur Krause, Ludwigshafen-on-the-Rhine, Ger., assignors to General Aniline Wks., Inc., N. Y., N. Y., No. 1,943,876, Jan. 16, 1934.

Dyestuffs of the Anthraquinone Series. Comprise reacting with paraphenylene-diamine upon a 1-amino-4-halogenanthraquinone-2-sulfonic acid and acylating the compound thus obtained with a halogenide; dye wool or other fibers from a neutral or weakly alkaline bath.) Klaus Weinand and Carl Taube, Leverkusen-I.G. Werk, and Hans Hertlein, Leverkusen-Wiesdorf, Ger., assignors animal fibers clear and strong bluish green to green shades, and also valuable for the dyeing of vegetable to General Aniline Wks., Inc., N. Y., N. Y., No. 1,941,-063, Dec. 26, 1933.

Appointed Superintendent

Arthur E. Hirst, formerly with the American Printing Company of Fall River, and later with the Imperial Printing and Finishing Company at Cranston, and the Carbic Color and Chemical Company of New York, has been appointed general superintendent of the Pacific Print Works of Lawrence, Massachusetts. Mr. Hirst will spend a few weeks at the Lyman, S. C., Division of the Pacific Mills before taking up his work actively in Lawrence.

Mr. Hirst graduated from the Massachusetts Institute of Technology in 1913, and immediately entered the employ of the American Printing Company at Fall River as chemist. Since that time he has been actively engaged in the textile printing and finishing branch of the textile industry, and is today recognized as one of the leading authorities of the country in this line of work. Mr. Hirst is a charter member of the American Association of Textile Chemists and Colorists, served as a councillor from 1921 to 1927, and has been an active member of the Research Committee since its inception in 1921.

Move Offices and Warehouse

The Barclay Chemical Company have announced the removal of their offices and warehouse to new and larger quarters in the Holland Plaza Bldg., 75 Varick Street, New York City. The telephone numbers are BArclay 7-0434-5-6.

Open Southern Branch

Announcement has been made by the Textile-Finishing Machinery Co. of Providence, R. I., of the establishment of a branch office at 919 Johnston Bldg., Charlotte, N. C., for the greater convenience of their customers in the South. Both H. G. Mayer and James Cook, who will be in charge of this office, are well known to the trade.

Adds to Staff

Alfred R. Macormac, since 1929 Professor of Textile Chemistry at Clemson College, S. C., has been engaged as chemical director by the Textile Chemical Products Co., of Greensboro, N. C. He will have supervision of development and manufacture of textile oils, soaps, and related chemicals.

OPEN FORUM

The first regular appearance of the Open Forum, as described in last issue, will appear in the issue of March 26th.

CLASSIFIED

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

POSITION WANTED—Dyer, married. Experienced on grosgrains, ribbon celanese, raw silk, cotton and rayon. Also can handle men. Reply Robert W. Fritzinger, 1143 Railroad St., Catasqua, Pa.

WANTED—By a large dyestuff manufacturer, salesman to cover Canada. Salesman with already established contacts with Canadian dyestuff consumers preferred. In replying please give details of your experience and technical training. Also references. Excellent future for the right man. Write Box No. 805, American Dyestuff Reporter, 440 ouFrth Avenue, New York, N. Y.

WANTED: Salesman, dyes, sulfonated and saponified oils, softening and finishing materials. New Jersey, New York, Brooklyn, New York State, and Connecticut. One having a following. State qualifications and salary expected. Write Box No. 806, American Dyestuff Reporter, 440 Fourth Avenue, New York, N. Y.